

**DIRECT TESTIMONY**

**OF**

**DR. KENNETH PETRUNIK**

**ON BEHALF OF**

**SOUTH CAROLINA ELECTRIC & GAS COMPANY**

**DOCKET NOS. 2017-207-E, 2017-305-E**

**Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION.**

A. My name is Dr. Kenneth “Ken” Petrunik. My business address is 2183 Shawanaga Trail, Mississauga, Ontario. I am a consultant in the nuclear power industry with a range of international clients and currently am a non-executive board member of Horizon Nuclear Power in the U.K.

**Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.**

A. I grew up in Sault Ste. Marie, Ontario, and have a Ph.D. in Chemical Engineering from the University of Windsor in Canada. I have worked in the nuclear power industry since completing my Ph.D. in 1973 and have nearly 45 years of experience in nuclear power and nuclear power plant construction. From 2009 to 2014, I served as Chief Program Officer for Emirates Nuclear Energy Corporation (ENEC) and led oversight of Korea Electric Power Corporation’s construction and delivery of four APR 1400 nuclear power plants built in the United Arab Emirates. Prior to that,

1 beginning in 1974, I worked for Atomic Energy of Canada, Limited  
2 (AECL) in a variety of positions and ultimately served as Chief Operating  
3 Officer and also President of the CANDU Reactor Division. In that role, I  
4 was responsible for AECL's commercial CANDU nuclear reactor business  
5 including marketing and delivery of new-build nuclear reactors and services  
6 to nuclear operating stations. During my time with CANDU Reactor  
7 Division, I began as a design engineer and before becoming COO and  
8 President of AECL CANDU worked on all of AECL's CANDU new build  
9 projects namely Darlington, Bruce, Pickering, Lepreau and Gentilly in  
10 Canada and internationally Embalse, Argentina; Cernavoda, Romania;  
11 Wolsong, Korea; and Qinshan, China. As COO and President of AECL  
12 CANDU, I was ultimately responsible for the overall commercial business  
13 of the enterprise.

14 **Q. DESCRIBE ANY ADDITIONAL PROFESSIONAL**  
15 **CERTIFICATIONS OR DISTINCTIONS YOU POSSESS THAT**  
16 **SUPPORT YOUR TESTIMONY.**

17 A. Before leaving Canada in 2009, I was a Registered Professional  
18 Engineer in the Province of Ontario, Canada and a Fellow of the Canadian  
19 Academy of Engineering, a group of Canadian engineers and related  
20 professionals elected based on their distinguished service and contribution  
21 to society, to Canada and the engineering profession. I was also a member  
22 of the Canadian Nuclear Society and the Canadian Nuclear Association

1 where I received a leadership award from the Canadian Nuclear  
2 Association for the successful completion of the Qinshan Nuclear Power  
3 Plant in China. In addition, I received the K. Y. Lo medal from the  
4 Engineering Institute of Canada for contribution to international  
5 engineering and the Friendship Award from the Chinese government for  
6 technical support to China. The Friendship Award is the highest award  
7 given by the Chinese government to a foreign expert.

8 **Q. HAVE YOU EVER TESTIFIED BEFORE THE PUBLIC SERVICE**  
9 **COMMISSION OF SOUTH CAROLINA (“COMMISSION”)**  
10 **BEFORE?**

11 A. No, I have not previously testified before the Public Service  
12 Commission of South Carolina (the “Commission”).

13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

14 A. The primary purpose of my testimony is to address the direct  
15 testimony of Elizabeth Warner and Anthony James. I will also provide the  
16 Commission with my conclusions regarding the prudence of SCE&G’s  
17 oversight of the construction of the Summer Nuclear Units 2 and 3 (the  
18 “Units”) located in Jenkinsville, South Carolina (the “Project”) and the  
19 sufficiency of SCE&G’s many disclosures to the Office of Regulatory Staff  
20 (ORS) and the Commission.

21 **Q. WHAT INFORMATION HAVE YOU REVIEWED REGARDING**  
22 **THE PROJECT?**

1 A. I have read and analyzed the key reports and documents related to  
2 the Project, including, but not limited to, SCE&G Quarterly Reports to the  
3 Commission, Monthly Reports from Westinghouse (“WEC”) and its  
4 consortium partner for the Project, first the Shaw Group and later Chicago  
5 Bridge and Iron (CB&I), monthly reports prepared by SCE&G’s new  
6 nuclear development (“NND”) team, direct testimony of SCE&G witnesses  
7 in proceedings before the Commission related to the Project, direct  
8 testimony of ORS witnesses in such proceedings, the resulting Commission  
9 orders, legislative reports made by ORS, other documents issued by ORS,  
10 and various documents related to or prepared by the Bechtel Corporation.  
11 In addition, I have interviewed SCE&G employees and I have visited the  
12 Project site. A partial list of the documents I have reviewed is attached as  
13 *Exhibit\_\_\_, (KP-I)*.

14 **Q. HAVE YOU READ AND ANALYZED THE BECHTEL REPORT(S)?**

15 A. Yes, I have read the Preliminary Results of Bechtel Assessment  
16 dated October 22, 2015, marked “DRAFT” and attached to Mr. James’  
17 testimony (the “Bechtel Presentation”), the Project Assessment Report  
18 dated November 19, 2015 and marked “DRAFT” (the “Draft Bechtel  
19 Report”), and the Project Assessment Report dated February 5, 2016 (the  
20 “Bechtel Report” and collectively the “Bechtel Reports”).

21 **Q. HAVE YOU READ ELIZABETH WARNER’S DIRECT**  
22 **TESTIMONY?**

1 A Yes, I have read Elizabeth Warner's direct testimony. Ms. Warner  
2 does not appear to offer any pertinent or relevant facts or opinions in her  
3 testimony. Her testimony instead merely attaches documents labeled as  
4 Exhibits A.1-A.7 and asserts that these documents are consistent with  
5 documents in possession of her employer, the South Carolina Public  
6 Service Authority or Santee Cooper. I have also read and analyzed Exhibits  
7 A.1-A.7 attached to Ms. Warner's testimony for any insight they might  
8 contain.

9 **Q. HAVE YOU READ ANTHONY JAMES' DIRECT TESTIMONY?**

10 A Yes, I have read Anthony James' direct testimony.

11 **Q. WHAT IS THE SUBSTANCE OF THAT TESTIMONY?**

12 A. Mr. James contends that revised rates related to the Project should be  
13 suspended because 1) the South Carolina Attorney General has questioned  
14 the constitutionality of the statutory basis for the revised rates; 2) SCE&G  
15 has stopped construction of the Project; and 3) SCE&G has withheld  
16 material information from the Commission. The only material information  
17 which Mr. James specifically asserts SCE&G withheld is a schedule  
18 contained in the Bechtel Presentation and Draft Bechtel Report.

19 **Q. HOW DO YOU RESPOND TO THE POINTS MADE BY MR.**  
20 **JAMES IN HIS TESTIMONY?**

21 A. I am not a lawyer and express no opinion regarding Mr. James' first  
22 two assertions. However, Mr. James is simply incorrect when he asserts

1       that SCE&G withheld material information from the Commission and ORS.  
2       The reports and other documents that were made available to ORS  
3       contained all of the material information that someone familiar with nuclear  
4       construction, specifically ORS's construction experts, would need to  
5       understand the status, schedule and challenges of the Project.

6               While the Bechtel Reports contained a number of reasonable and  
7       useful suggestions for improving the efficiency of the Project, those  
8       suggestions are made in response to challenges and problems that were well  
9       known and clearly identified in other documents. The Bechtel Reports did  
10      not identify any undisclosed issues or challenges. The issues and challenges  
11      discussed in the Bechtel Reports were the same issues and challenges that  
12      had been discussed and disclosed in numerous reports and other documents  
13      provided to ORS. The Bechtel Reports did not provide any material  
14      information about those issues and challenges that was not disclosed in  
15      other documents and well known to those following the Project.

16             The documentary record shows that ORS, as the state regulatory  
17      agency charged with direct oversight in these matters, had all the  
18      information necessary to understand where the Project stood and the  
19      challenges it faced without reference to the Bechtel Reports.

20             In addition, as I explain below, the construction schedule contained  
21      in the Bechtel Presentation and Draft Bechtel Report was based on

1 inadequate information, did not reflect key Project data and was properly  
2 excluded from final Bechtel Report.

3 **Q. WHAT IS YOUR UNDERSTANDING OF THE ROLE OF ORS IN**  
4 **PROTECTING THE PUBLIC INTEREST RELATED TO THIS**  
5 **CONSTRUCTION?**

6 A. As indicated above, it is my understanding that ORS represented the  
7 public interest in these matters and reported its conclusions about the  
8 Project to the Commission and the public. It did so through the monthly  
9 and quarterly reports that ORS issued on the Project, the testimony and  
10 reports it provided in proceedings before the Commission over the course  
11 of the Project, the settlement agreements it adopted and other reports and  
12 public statements. I have reviewed a number of ORS's reports, documents  
13 and public statements related to the Project. They show that ORS  
14 understood the challenges faced by the Project very well. I do not see any  
15 relevant and material facts discussed in the Bechtel Reports that ORS did  
16 not understand or failed to acknowledge in its reports and public  
17 statements.

18 **Q. WHAT DO YOU CONCLUDE BASED ON YOUR REVIEW OF THE**  
19 **INFORMATION PROVIDED TO ORS CONCERNING SCE&G's**  
20 **DISCLOSURE OF THE PROJECT STATUS?**

21 A. Mr. Young and Mr. Kochems testify concerning the information that  
22 was provided to ORS which included practically all the information

1 available to SCE&G as owner of the Project. I have reviewed the monthly  
2 construction reports issued by WEC/CB&I and SCE&G, other construction  
3 reports, as well as the quarterly reports that were prepared and filed with  
4 ORS and the Commission and made available to the public.

5 The monthly construction reports that ORS reviewed are standard  
6 reports used in managing projects of this sort. The monthly reports for this  
7 Project were quite comprehensive and very detailed. They included  
8 information concerning milestones, delays, problems, schedule issues,  
9 inspections, and critical paths. They ran over 100 pages in length often and  
10 included a great deal of supporting documentation. They were the basis on  
11 which monthly project review meetings were conducted and the individuals  
12 who contributed to them were questioned about what they reflected.

13 To anyone reasonably experienced in nuclear construction, these  
14 reports communicated a clear picture of where the Project stood month-to-  
15 month and quarter-to-quarter. They clearly communicated the challenges  
16 being faced by the Project and the difficulties the Project was encountering  
17 in meeting the substantial completion date commitments which  
18 WEC/CB&I made.

19 In addition, SCE&G also produced quarterly reports specifically for  
20 ORS which summarized and expanded on the material provided in the  
21 monthly reports. These in turn were supplemented by annual construction



1 updates conducted either in formal hearings before the Commission or in  
2 allowable ex parte information briefings.

3 I have reviewed all these documents and they clearly indicate that  
4 ORS had all the information needed to understand where the Project stood  
5 and what challenges it faced, specifically as to the completion schedule, but  
6 also concerning the other important challenges involved. The Bechtel  
7 Reports did not include material information that was not otherwise  
8 disclosed to ORS.

9 **Q. IN YOUR OPINION WAS ORS IN A POSITION TO UNDERSTAND**  
10 **THE INFORMATION THAT WAS PROVIDED TO IT ABOUT THE**  
11 **PROJECT?**

12 A. Absolutely. ORS also had at its disposal the expert advice necessary  
13 to review and understand the information provided and to interpret it for  
14 ORS and the public. Specifically, ORS was advised in these matters by Mr.  
15 Gary Jones whose resume shows him to have sufficient training and  
16 practical experience in nuclear construction to understand the information  
17 provided, which was extensive. Mr. Jones' work was supplemented by  
18 ORS employees assigned to this Project who also had experience in  
19 technical and construction matters.

1    **Q.    DO ORS'S PUBLIC STATEMENTS SHOW THAT ORS IN FACT**  
2           **UNDERSTOOD THE SCHEDULE CHALLENGES FACED BY THE**  
3           **PROJECT?**

4    A.            Yes. The record clearly shows that ORS understood the schedule  
5           challenges faced by the Project and was in no way misled by any  
6           withholding of information. For example, in its August 2016 report to the  
7           Public Utility Oversight Committee of the South Carolina General  
8           Assembly, ORS stated the following:

9                    However, the project has been plagued by challenges  
10                   including, among others, the dissolving of the project's consortium;  
11                   exit of CB&I; arrival of Fluor; new engineering, procurement and  
12                   construction contract; increase in the budget; and a further delay in  
13                   the construction schedule.

14                   The ORS believes it is possible that Unit 2 may still be able to  
15                   qualify for the Federal Production Tax Credits (FPTC) that expire on  
16                   December 31, 2020, even though it is unlikely that it will meet the  
17                   August 2019 substantial completion date requested in SCE&G's  
18                   most recent filing. Completing Unit 2 in time to receive the FPTC  
19                   will require improvements to the current construction methodology.  
20                   It is less likely that Unit 3 can be completed in time to meet its  
21                   current FPTC deadline of December 31, 2020.

22                   In October of 2016, Mr. Jones testified in Docket No. 2016-223-E as  
23                   follows:  
24                   follows:

25                   In its Petition, SCE&G states the revised GSCD [Guaranteed  
26                   Substantial Completion Dates] are August 31, 2019 for Unit 2 and  
27                   August 31, 2020 for Unit 3 per the [2015 EPC Contract]  
28                   Amendment. . . . ORS finds that the completion dates for the Units  
29                   will be extended to at least these dates, and, in all likelihood, will  
30                   extend beyond the revised GSCDs. . . .  
31                   . . .  
32                   . . .

1                   Although the basic logic and sequencing of precursor and  
2                   successor events and the level of detail presented in identifying the  
3                   tasks and work scope in the current revised schedule appear sound,  
4                   the assigned durations and the labor hours assigned to these tasks are  
5                   highly questionable in that they appear to be too low. . . . Targeted  
6                   productivity has not been achieved and the performance factors for  
7                   each of the crafts have been significantly below expectation and  
8                   goals. . . . This basically means that the Project will either (1) take  
9                   longer, or (2) will require significant improvements in efficiency and  
10                  productivity and/or more resources than are currently anticipated.

11  
12                  Transcript of Hearing, Docket No. 2016-223-E at pp. 27-28. These  
13                  are just two examples of an extensive record of statements and reports  
14                  indicating that ORS fully understood the risks and challenges faced by the  
15                  Project and was not in any way kept in the dark by non-disclosures. ORS  
16                  did not choose to present any testimony by Mr. Jones in this proceeding.  
17                  Nonetheless, his testimony in prior dockets and the statements ORS has  
18                  made publicly are very clear. ORS was not in any way ignorant or misled  
19                  about the status of the Project. In the quarterly reports, the monthly  
20                  construction reports, and the other information that SCE&G provided, ORS  
21                  and its experts had the information they needed to understand the schedule  
22                  concerns faced by the Project. And they did understand those concerns.

23   **Q.   CAN YOU PROVIDE EXAMPLES OF SCE&G'S PRIOR**  
24   **DISCLOSURE TO THE COMMISSION AND ORS OF THE ISSUES**  
25   **DISCUSSED IN THE BECHTEL REPORTS?**

26   A.           Yes. Attached to my testimony as *Exhibit* \_\_, (KP-2) is a  
27                  compilation of specific instances of disclosures that are found in the

1 reports, testimony, and other public disclosures associated with the Project.  
2 This compilation organizes those statements and disclosures around the key  
3 challenges identified in the Bechtel Reports.

4 This compilation is an expanded and revised version of a  
5 compilation assembled by SCE&G and previously filed in Docket No.  
6 2017-305-E in support of a motion to dismiss the petition in this matter  
7 filed by SCE&G. My version of this compilation includes citations to  
8 additional documents which have been produced during discovery and goes  
9 beyond what was submitted earlier. It shows that each of the major  
10 challenges to the Project that were discussed in the Bechtel Reports were  
11 fully understood by ORS and disclosed to the public. As mentioned above  
12 there is no failure of disclosure related to this Project.

13 The source documents in which *Exhibit* \_\_\_\_, (*KP-2*) is based are  
14 attached as *Exhibit* \_\_\_\_, (*KP-3*). They include hearing and ex parte  
15 information and briefing transcripts, quarterly reports filed by SCE&G,  
16 quarterly reports filed by ORS, monthly reports by ORS to the General  
17 Assembly of the State of South Carolina, presentations made by ORS to the  
18 South Carolina Energy Users Committee and in one case, the notes of a  
19 presentation by ORS to the General Assembly made on November 29,  
20 2016. These ORS reports and other documents were provided directly by  
21 ORS or in response to discovery requests in this matter or filed by ORS in  
22 docket no. 2008-196-E.

1   **Q.   HAVE YOU READ AND ANALYZED THE PROFESSIONAL**  
2       **SERVICES AGREEMENT UNDER WHICH BECHTEL**  
3       **CONDUCTED ITS REVIEW?**

4   A.       Yes. I have.

5   **Q.   FOR WHAT PURPOSE WAS BECHTEL HIRED AND BY WHOM?**

6   A       Bechtel was hired by the law firm of Smith, Currie & Hancock LLP,  
7       which represented SCE&G and Santee Cooper, to assist those lawyers and  
8       the project owners “in better understanding the current status and potential  
9       challenges of the Project in anticipation of litigation and to ensure the  
10      Project is on the most cost-efficient trajectory to completion.” Bechtel’s  
11      work was specifically intended to be directed by an attorney from Smith  
12      Currie & Hancock. The scope of work was set forth in detail in that  
13      document. As Mr. Addison and Mr. Kochems testified, at the time, there  
14      were escalating payment and other disputes that seemed to be leading  
15      toward litigation or other forms of legal dispute resolution.

16           Bechtel was asked to conduct a review of the owner’s organizational  
17      charts and structure, the Consortium’s organizational charts, the monthly  
18      construction progress reports, the milestone management schedules, the  
19      integrated engineering, procurement and construction schedules, cost and  
20      schedule forecasts, staffing projections, supply chain and module  
21      fabrication information and other documents. Bechtel was to supplement

1           this documentary review with meetings with key Consortium personnel,  
2           site walk downs and interviews with owners' leadership team.

3   **Q.   DID YOU FIND ANY MATERIAL INFORMATION IN THE**  
4   **BECHTEL REPORTS THAT HAD NOT BEEN OTHERWISE**  
5   **DISCLOSED?**

6   A.           No. I found no material undisclosed information or other surprises in  
7           the Bechtel Reports. The issues raised in the Bechtel Reports had been  
8           acknowledged and described in detail in quarterly reports to ORS, the  
9           monthly construction reports and other material made available to ORS,  
10          and in the testimony and other filings before the Commission.

11           Furthermore, as a general matter, the problems that were identified  
12          in the Bechtel Reports were generally known in the nuclear construction  
13          industry to be problems faced by the two U.S. AP 1000 projects. Members  
14          of the industry, myself included, were well aware of the nature of these  
15          problems, including the schedule problems.

16           In addition, I also did some review work for WEC in the setting up  
17          of the Moorside AP1000 project in the UK and on the WEC bid to  
18          construct multiple AP1000 units in India and was aware of challenges in  
19          the existing AP1000 projects which were a matter of concern and  
20          discussion for the potential owners of these proposed projects. In addition,  
21          on my own initiative, some time ago I visited the Sanmen site in China  
22          where the AP1000 units were under construction but behind schedule.

1 Considering what I knew about the Project prior to being retained by  
 2 SCE&G, there was nothing new or surprising about what I saw in reading  
 3 the Bechtel Reports.

4 As shown in *Exhibit* \_\_\_\_, (*KP-2*), the issues and challenges  
 5 confronted by this Project were clearly disclosed.

6 **Q. WAS THE BECHTEL REPORT CURRENT WHEN ISSUED?**

7 A. No. Bechtel issued its report in 2016 based on an analysis conducted  
 8 in the late summer and fall of 2015. Bechtel formulated its conclusions  
 9 before the 2015 Amendments to the Engineering, Procurement &  
 10 Construction Agreement (“EPC Contract”). Those amendments:

- 11 • Scrapped the Consortium structure,
- 12 • Released CB&I from the Project,
- 13 • Allowed Fluor to be hired as construction contractor under WEC,
- 14 • Allowed for a fixed price guarantee for completing the EPC  
 15 Contract work,
- 16 • Increased liquidated damages and completion incentives,
- 17 • Limited future change orders, and
- 18 • Restructured other commercial terms of that Agreement.

19 As the Bechtel Reports indicate, many of the individual  
 20 recommendations –by most counts a majority of them– were negated by  
 21 these changes in the Consortium structure and other changes made by the

1       2015 EPC Amendments. This made the report largely outdated before it  
2       was issued.

3               In addition, immediately after the 2015 EPC Amendments were  
4       signed Fluor began to conduct reviews and other initiatives to create new  
5       staffing plans, streamline work packages, resolve engineering bottlenecks,  
6       formulate mitigation plans, and revise the Project construction schedule. In  
7       addition, a new project management oversight structure was imposed in late  
8       2015, which negated yet another recommendation contained in the Bechtel  
9       Report. Many of the actions represented recommendations of the Bechtel  
10      Report that were already in process before the report was issued.

11              For these reasons, the Bechtel Report was essentially outdated when  
12      issued and became more outdated with each passing month.

13   **Q.   HAVE YOU FORMED ANY OTHER OPINIONS REGARDING THE**  
14   **BECHTEL REPORTS?**

15   A.       Yes, based on my review I have reached two primary conclusions  
16      regarding the Bechtel Reports. First, as stated above, the Bechtel Reports  
17      do not contain material information that was not previously known to  
18      SCE&G and disclosed to the ORS. Second, the schedule estimate contained  
19      in the Bechtel Presentation and Draft Bechtel Report is derived from a  
20      limited access to the Project and is unreliable. The decision not to include  
21      that schedule estimate in the final version of the report was entirely logical  
22      and supportable.



1   **Q.    WAS BECHTEL RETAINED OR AUTHORIZED TO GENERATE**  
2   **ITS OWN PROPOSED SCHEDULE FOR THE PROJECT?**

3   A.           No. According to the scope of work for the Project, Bechtel was not  
4               hired or authorized to generate a proposed schedule for the Project nor was  
5               it given access to the information required to do so, as Bechtel itself admits  
6               in the report.

7   **Q.    IN WHAT WAYS WAS THE SCHEDULE INFORMATION IN THE**  
8   **BECHTEL REPORTS FLAWED AND UNRELIABLE?**

9   A.           Given its scope of work under which Bechtel was hired, and the  
10              limitations under which it operated, Bechtel did not have sufficient  
11              information to create an accurate schedule for completion of the Project.  
12              Most importantly, as Bechtel freely admitted, it did not have access to the  
13              Level 3 Schedule<sup>1</sup> for the Project. It was simply impossible for Bechtel to  
14              accurately evaluate schedule and milestone delays and to revise and predict  
15              future completion dates without access to a Level 3 Schedule for the  
16              Project.

17   **Q.    WERE YOU SURPRISED THAT BECHTEL WAS NOT GIVEN THE**  
18   **KIND OF ACCESS TO DATA THAT IT WOULD HAVE NEEDED**  
19   **TO COMPILE ITS OWN PROJECT SCHEDULE?**

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<sup>1</sup> The Level 3 schedule spans the whole of a project and includes all major milestones, major elements of design, engineering, procurement, construction, testing, commissioning and/or start-up.

1 A. No, not at all. There was no reason to give Bechtel the sort of access  
2 to data required to create a new project schedule. Bechtel was never  
3 authorized to create a new project schedule. In fact, there is no indication in  
4 the documents that SCE&G was even aware that Bechtel was preparing an  
5 alternative project schedule until one appeared in the presentation materials  
6 at the end of Bechtel's work.

7 **Q. WHAT SORT OF DATA ACCESS LIMITATIONS DID**  
8 **WESTINGHOUSE AND CB&I IMPOSE ON BECHTEL AND WHY?**

9 A. Bechtel is a direct competitor of CB&I and Fluor and at the time  
10 could be considered a potential competitor of Westinghouse in the areas of  
11 project management and delivery. These companies were understandably  
12 reluctant to provide Bechtel with data that Bechtel could compete against  
13 them for future business. For that reason, WEC and CB&I required Bechtel  
14 to review data in secure reading rooms and not copy that data into Bechtel's  
15 systems and programs. These limitations did not prevent Bechtel from  
16 conducting review and critique of the existing project schedule that it was  
17 tasked to do. But these limitations did prevent Bechtel from exporting the  
18 data and information needed to compile its own project schedule into its  
19 own computer systems. This prevented Bechtel from using the existing  
20 construction schedule and other site-specific data and information,  
21 including information about mitigation plans, to create its own schedule.  
22 As a result, the Bechtel schedule was more qualitative than quantitative.

1 **Q. DID THE UNAUTHORIZED NATURE OF THE BECHTEL**  
2 **SCHEDULE LIMIT IT IN OTHER WAYS?**

3 A. Yes. Because the creation of this schedule was unauthorized,  
4 Bechtel could not seek WEC/CB&I's help in incorporating into Bechtel's  
5 scheduling software information about the specific mitigation efforts that  
6 were underway, the evolution of the Project and its critical path, and the  
7 effect of the experience curve on the future productivity and schedule  
8 compliance. Going it alone as it did, Bechtel was required to create a  
9 schedule based on generic information from other nuclear projects, general  
10 productivity and staffing trends, and similar non-specific resources. For  
11 that reason, the draft schedule included in the Bechtel Presentation and  
12 Draft Bechtel Report was unreliable and incomplete. The report itself  
13 indicates as much. The decision not to include this schedule in the final  
14 report was entirely justified for those reasons.

15 **Q. WAS ANOTHER, BETTER INFORMED SCHEDULING EFFORT**  
16 **UNDERWAY AT THE TIME THE BECHTEL REPORT WAS**  
17 **ISSUED?**

18 A. Yes. At the time the Bechtel Report was issued in early 2016, Fluor  
19 was engaged in creating a new fully resource loaded construction schedule  
20 based on access to all relevant data, mitigation plans, and other information.  
21 This is another reason why it made sense not to proceed publicly or  
22 otherwise with the Bechtel schedule. In addition, SCE&G had reached a

1 settlement agreement with WEC in 2015 which was eventually approved by  
2 the Commission in 2016 and which transferred substantial risk to WEC in  
3 project completion costs and revised completion dates. These dates were  
4 from WEC with Fluor, the vendor who had all of the project information  
5 and very importantly commercially took on these completion risks and  
6 dates which were challenging. In other words, they put their money on their  
7 words. This was an appropriate schedule to rely on.

8           Also, SCE&G's approach was right in a project management sense.  
9 The delayed Bechtel dates were factually unsupported. But acknowledging  
10 them as reasonable would have taken pressure off of WEC and CB&I to  
11 meet the existing and more challenging schedule commitments WEC and  
12 CB&I had made. It would have removed the urgency around the existing  
13 dates. This is not a theoretical issue. I have seen this happen before. Also  
14 in my experience, projects in delay have recovered, most notably in  
15 Qinshan, China where the units I led were about four months late at the  
16 mid-point but recovered. It took a combined vendor-owner partnership  
17 committed to the earlier dates to recover those delays and even resulted in  
18 completion one month early. I also experienced the learning curve on the  
19 project which helped to bring the second unit into service some four months  
20 early.

1 **Q. WHAT OTHER LIMITATIONS IMPAIRED BECHTEL'S ABILITY**  
2 **TO ACCESS THE PROJECT?**

3 A. Several other circumstances hindered Bechtel's ability to prepare an  
4 accurate schedule for the Project. Notably, Bechtel did not have any  
5 experience with the new U.S. Nuclear Regulatory Commission (NRC)  
6 regulatory standards which applied to the Project. The Project is subject to  
7 Part 52 - LICENSES, CERTIFICATIONS, AND APPROVALS FOR  
8 NUCLEAR POWER PLANTS of the NRC regulations ("Part 52"). To my  
9 knowledge, Bechtel has never been a vendor or builder of a project subject  
10 to Part 52 until it supplanted Fluor Corporation as the contractor for the  
11 Vogtle project in late 2017. At the relevant time, therefore, Bechtel lacked  
12 the institutional knowledge necessary to understand the value of prior Part  
13 52 project lessons learned and to transform those lessons learned into  
14 schedule efficiencies. Similarly, Bechtel did not account for SCE&G  
15 formal collaboration with the firms building AP1000 units in China and  
16 SCE&G and the Consortium's ability to incorporate lessons learned from  
17 AP1000 construction in China into the Project going forward. Each of  
18 these circumstances hindered Bechtel's ability to access the Project and its  
19 ability to quantitatively predict a completion schedule for the Project.

20 **Q. WHY WOULD A COMPANY LIKE BECHTEL CREATE A**  
21 **PROJECT SCHEDULE THAT THE CLIENT DID NOT REQUEST?**

1     A.           It is well recognized in the nuclear construction industry that firms  
2           like Bechtel have an economic reason to use one-off consulting  
3           opportunities to develop new or expanded assignments. There is nothing  
4           wrong with this practice, which is well recognized in the industry. It is  
5           referred to as “leaving a trail of bread crumbs” and the bread crumbs lead to  
6           more work for the consulting firm. People with experience in the  
7           construction industry understand and expect that consulting firms may do  
8           this. And sometimes when they do they play up negative findings to create  
9           a sense of urgency around the need to hire the firm to fix the problems  
10          identified. Generally speaking, there is nothing wrong with this as long as  
11          it is recognized and the findings are not misinterpreted. Reports produced  
12          in these circumstances need to be read with this fact in mind.

13    **Q.    YOU INDICATED EARLIER THAT YOU HAD AN OPINION**  
14    **CONCERNING THE PRUDENCY OF SCE&G’S ACTIONS**  
15    **RELATED TO THE PROJECT. CAN YOU SHARE THAT OPINION**  
16    **WITH US?**

17    A.           SCE&G’s role in the Project was largely defined by the EPC  
18           Contract which it entered into with the Westinghouse Consortium so that it  
19           could access the AP1000 Advanced Passive Safety technology. The  
20           AP1000 technology was clearly a good choice in light of Westinghouse’s  
21           experience and standing in the industry, and the technology of the AP1000  
22           design itself. Another very important consideration was that SCE&G was

1 already operating a Westinghouse pressurized water reactor at the  
2 Jenkinsville site and had been doing so safely and effectively for  
3 approximately 30 years. For a number of reasons, it is best to have  
4 comparable reactor designs on a given site.

5 I know the attractiveness of the AP1000 Advanced Passive Safety  
6 design from direct experience in competing against it. My former company  
7 AECL was a competitor of WEC in China. In the end, China chose  
8 AP1000 technology over our design and over the existing, domestic  
9 Chinese reactor design. I understood why the Chinese selected the WEC  
10 AP1000 over the other designs. The AP1000 passive safety design is a  
11 major advance in the technology and WEC was a very well respected  
12 design firm.

13 As a practical matter, choosing the AP1000 technology for the  
14 Project entailed choosing Westinghouse and its consortium partner to  
15 construct the Units under an EPC Contract. Those were the terms on which  
16 the technology was offered and bid. As is the case with all projects being  
17 delivered under an EPC process, the EPC Contract defined SCE&G's role  
18 as owner and set the limits within which SCE&G could effectively operate.

19 The documents that I have reviewed show that SCE&G set a tone  
20 and culture of openness and communications in undertaking its role as  
21 owner of the Project. I fully appreciate the value of this approach as it is the  
22 same model that helped my success in China in completing two units ahead

1 of schedule and under budget. SCE&G's approach is quite clear in the  
2 documentary record. At every stage of the Project, SCE&G appropriately  
3 and consistently focused on finding constructive and practical resolutions to  
4 issues as they arose.

5 The documentary record also shows that SCE&G understood its role  
6 as an owner operating under an EPC Contract. Its job was to demand  
7 performance from the EPC contractors without directing the means or  
8 methods used to accomplish the work, or usurping the role of the  
9 contractors to manage the work. Under an EPC Contract, the choice of  
10 means and methods are exclusively the contractors' responsibility. And that  
11 was spelled out in the EPC Contract. When owners seek to dictate means  
12 and methods, the contractor can treat all owners' directives as change  
13 orders and this can dramatically increase the cost of the project and lead to  
14 conflict and disputes. SCE&G's actions show that it understood the line  
15 between demanding performance and directing means and methods.  
16 SCE&G exercised its authority as owner appropriately and effectively.

17 In addition, SCE&G wisely adopted a graded approach to oversight  
18 of the Project. By that I mean that SCE&G calibrated its level of oversight  
19 and resources committed on an area-by-area basis to reflect the seriousness  
20 of the problems in each area of the Project and risks those problems posed.  
21 SCE&G identified in a timely and effective way the areas where problems  
22 were emerging that posed a threat to the Project and its schedule. And then



1 SCE&G focused its efforts and attention on those areas and enhanced its  
2 oversight and commitment of resources to match the difficulty of the  
3 problems and the potential consequences if they were not corrected as they  
4 developed. I would also note that SCE&G disclosed those focus areas in its  
5 quarterly reports in a timely fashion as they emerged. I successfully used  
6 the same graded approach in my oversight role over the Korean APR 1400  
7 units under construction in Barakah, UAE.

8 The documentary record also shows that SCE&G understood the  
9 danger of an owner overplaying its hand related to commercial issues.  
10 SCE&G quite properly identified its challenge to be that of vigorously  
11 enforcing its rights under the EPC Contract while not destroying the  
12 working relationships necessary to successfully complete a project of this  
13 scope. SCE&G took constructive action at multiple stages of the Project to  
14 resolve and mitigate the destructive effects of commercial disputes.  
15 SCE&G actively worked to avoid a confrontational culture with the  
16 Consortium and to promote efficient and effective problem solving as long  
17 as it was possible to do so. Adopting a confrontational culture early in the  
18 Project most certainly would have resulted in higher costs and longer  
19 delays.

20 However, SCE&G was not afraid to push commercial issues hard  
21 when it saw no other alternative for motivating the Consortium to solve  
22 problems that threatened the successful completion of the Units. I would

1 specifically note SCE&G's actions taken in 2014 and 2015 to place  
2 commercial pressure on the Consortium by disputing or refusing to pay  
3 millions of dollars of invoices that it asserted were the result of delay, poor  
4 productivity or inefficiency. In taking this action, SCE&G took a calculated  
5 risk. Its actions could have caused a breakdown of the Project and very  
6 nearly did. The Consortium threatened in writing to walk off the job in  
7 response. But in light of the seriousness of circumstances, taking such risks  
8 was justified at that time.

9 It has been my experience, over many such projects, that the  
10 approach SCE&G took as owner was the most prudent and constructive  
11 approach available to an owner under the EPC Contract. It is my opinion  
12 that SCE&G discharged its functions as an owner with great insight and  
13 care.

14 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

15 A. Yes, it does.

16